REMARKS

Claims 1-6, 11, and 13-20 remain pending in the application, and claim 1 is the only independent claim. The Examiner has withdrawn the previous rejections in view of new grounds for rejection, as set forth below. Favorable reconsideration of the application is respectfully requested in view of the following remarks.

I. REJECTION OF CLAIMS PURSUANT TO 35 U.S.C. § 103(a)

A. Claims 1-6, 11, and 13-18

In response to the previous Office Action, independent claim 1 was amended to recite: "A method of growing a p-type nitride semiconductor material by molecular beam epitaxy, the method comprising supplying bis(cyclopentadienyl)magnesium (Cp_2Mg) during the growth process, and carrying out the growth process at a temperature from 920°C to 960°C so that carbon contamination caused by Cp_2Mg is reduced in the semiconductor material."

In the current Final Office Action, claims 1-6, 11, and 13-18 stand rejected pursuant to 35 U.S.C. § 103(a) as being obvious over Barnes et al., U.S. Patent Application Publication No. 2004/0214412 (Barnes) in view of Mayer et al, *Journal of Crystal Growth*, 201/202 (1999) at pages 318-322 (Mayer). Barnes has been applied in previous Office Actions and discloses an MBE process in which elemental magnesium is used as the p-type dopant material. The Examiner recognizes that Barnes does not disclose the use of Cp_2Mg as a p-type dopant, nor reducing carbon contamination in the manner claimed. The Examiner, however, states that Mayer discloses such features and concludes that it would have been obvious to combine the disclosures of Barnes and Mayer to arrive at the claimed invention. Applicants traverse the rejections for at least the following reasons.

Mayer describes an MBE process that appears to use Cp_2Mg as the p-type dopant material. (See Mayer at section 2 and the first paragraph of section 4.) Applicants disagree with the Examiner, however, that Mayer additionally discloses the claim features of "carrying out the growth process at a temperature from 920°C to 960°C

so that carbon contamination caused by Cp_2Mg is reduced in the semiconductor material."

The Examiner cites to Mayer at "page 320, right column, lines 5-10" as disclosing the referenced features. (It appears that the passages at issue actually are in the left column of page 320.) Referring to this passage, the Examiner states:

> Mayer et al. also teach the intensity of all bound excitations decreases with increasing temperature. The free excitations dominate the spectra at temperatures above 29 K and at about 80 K even ***the free excitation C (carbon)*** becomes visible (see page 320, right column, lines 5-10) in which this means by increasing the temperature of the growth process the carbon contamination significantly decreases in the semiconductor material, wherein the increased temperature can fall within a temperature of 920°C to 960°C as suggested by Barnes et al. (412).

(Final Office Action at page 6, emphasis added.)

The Examiner, therefore, considers the reference to a "free excitation C" as a reference to carbon contamination. The Examiner is simply incorrect, as one skilled in the art would understand. The Examiner's reference to a purported "***excitation***" actually is referred to Mayer as an "***exciton***" (not "excitation"). An "exciton" is a term relating to an excited state of an electron that may be generated in a semiconductor material. As one skilled in the art understands, excitons may arise in a variety of forms, which those skilled in the art may refer to, for example, as A-excitons, B-excitons, or C-excitons.

Mayer's reference to the "free exciton C" thus has nothing to do with carbon in any sense, but rather relates to the C-type exciton. One skilled in the art, therefore, would not understand Mayer as teaching any mechanism for reducing carbon contamination.

In this vein, one skilled in the art would not conceive that what is described in the cited passage of Mayer, occurring at 29-80°K (***the equivalent of -244.15°C to -193.15°C***) could be relevant to any process being performed above 900°C, as disclosed in Barnes. In fact, with respect to growth processes Mayer discloses only that growth temperatures should be around 750°C (see Mayer at section 4, second paragraph), and

only in relation to dissolving Mg-H complexes such that a higher density of charge carriers is formed. There is, therefore, no disclosure or suggestion in Mayer to reduce carbon contamination in the manner claimed.

A combination of Mayer with Barnes, therefore, does not result in, disclose, or suggest the claim features of "carrying out the growth process at a temperature from 920°C to 960°C so that carbon contamination caused by Cp_2Mg is reduced in the semiconductor material", as recited in independent claim 1. Claim 1, therefore, is not obvious over Barnes in view of Mayer, and claims 2-6, 11, and 13-18 are not obvious for at least the same reasons.

B. Claims 19-20

Claims 19-20 stand rejected pursuant to 35 U.S.C. § 103(a) as being obvious over Barnes and Mayer, and further in view of a more tertiary reference, Hooper et al., U.S. Patent Application Publication No. 2002/0117103 (Hooper). Hooper is cited as disclosing the pressures of supplied elemental gallium and aluminum, as recited in claims 19 and 20. Hooper does not supply the deficiencies of the combination of Barnes and Mayer, described above, and the Examiner does not indicate otherwise.

For at least these reasons, claims 19-20 also are not obvious over Barnes, Mayer, and Hooper, whether individually or in any combination thereof. Accordingly, the rejections should be withdrawn.

II. CONCLUSION

For the foregoing reasons, claims 1-6, 11, and 13-20 are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional

extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988, reference number YAMAP0983US.

Respectfully submitted,

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